

Doc. 95-42

WILMER, CUTLER & PICKERING DOCKET FILE COPY ORIGINAL

2445 M STREET, N.W.
WASHINGTON, D. C. 20037-1420

TELEPHONE (202) 663-6000
FACSIMILE (202) 293-0074
TELEX 440239 WCP US

4 CARLTON GARDENS
LONDON SW1Y 5AA
TELEPHONE 011 (4471) 839-4466
FACSIMILE 01 (4471) 839-3537
TELEX 8813918 WCP LON

WILLIAM R. RICHARDSON, JR

DIRECT LINE (202)

663-6038

RUE DE LA LOI 15 WETSTRAAT
B-1040 BRUSSELS
TELEPHONE 01 (322) 231-0903
FACSIMILE 01 (322) 230-4322

January 27, 1994

BY HAND

Douglas W. Webbink, Chief
Policy and Rules Division
Mass Media Bureau
Federal Communications Commission
2025 M Street, N.W., Room 8010
Washington, D.C. 20554

RECEIVED

MAY - 9 1995

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

Dear Mr. Webbink:

On behalf of Yes! Entertainment Corporation, and in response to your request by letter dated November 24, 1993, this provides additional information concerning the proposal by Yes! to encode a signal in the active video portion of the broadcast transmission, in order to activate the voice of its interactive toy, "TV Teddy."

As noted in my letter of November 8, 1993, the TV Teddy signal is designed to take advantage of the "overscan" characteristic of television receivers. You have asked for a more detailed description of the proposed signal -- "type of modulation, signal level, data rate, etc." As set forth in the attached engineering report, the TV Teddy signal involves pulse amplitude modulation, a maximum signal level of 100 IRE, and a data rate of 14,160 pulses per second.

Your November 24 letter also asked that Yes! test a larger sample of television receivers, to include current as well as older models, and a variety of sizes to include "projection" sets. As the attached report indicates, Yes! engineers recently sampled all 30 television receiver models on display and available to them at the "Good Guys" outlet in Danville, California, a California retailer analogous to (and a competitor of) Circuit City, and six more available at another Good Guys outlet in San Francisco. This sample included a variety of sizes and models currently viewed as the most popular with consumers. Yes! supplemented this Good Guys sample with 66 other sets located at Yes! offices or the homes of its employees, or previously sampled by Capital Cities/ABC, Inc. The 102 set sample included various models of all of the 15 most popular brands among others (see Attachment 6), sizes from under 10 to over 50 inches (see Attachment 4), and ten rear projection models. See generally Attachment 1.

The first step in the study was to measure the extent of overscan and then to compare it to the TV Teddy pulse. As the report indicates, in none of these 102 models was the measured overscan less than the pulse width of the TV Teddy signal. Yes! also validated by visual observation, in the set with the smallest measured overscan that was available, that the TV Teddy signal was not in fact visible. This was done using a standard

TV Teddy packout tape on a VHS recorder, which as noted in the report would be likely to overstate the extent of any problem.

As described in the report, these results are fully consistent with the Yes! development experience, which has identified no visible problems with the signal on sets at Yes! offices. The report is also consistent with the absence of any complaints of visual degradation from any of the over 200,000 purchasers of the VHS tape version of the product. As the report explains, the signal as broadcast would have an even narrower pulse than that used on the VHS tape version; thus, the likelihood of any visual appearance of the signal during broadcast, even in part, appears exceedingly remote.^{1/}

Your letter also asks Yes! to address the issue of signal display on "multimedia" computer monitors. Good Guys does not sell such multimedia computers, and Yes! was unable to locate one in order to test it. Since 99% of all U.S. households currently have NTSC television sets,^{2/} there appears to be little prospect of reliance on such multimedia computers for viewing television programs in the foreseeable future.^{3/} Moreover, such

^{1/} Your letter asks "how . . . the proposed signal appear[ed] when it was observed." We have enclosed a videotape of what the signal would look like if it had appeared (which it did not). This videotape shows the signal on a monitor with no overscan, first in its entirety, then at 50%, and finally at 25%.

^{2/} 1994 Television & Cable Factbook I-21.

^{3/} Cf. Sanyo Mfg. Corp., 58 R.R.2d 719, 722 (1985), aff'd after remand sub nom. Association of Maximum Service Telecasters (continued...)

computers would not appear to be the kind of apparatus that the Commission has viewed as designed to receive television pictures;^{4/} Yes! understands, for example, that computers cannot receive such pictures unless the customer independently purchases and installs a separate card at substantial additional expense. It would also be difficult to determine whether any appearance of the signal on such a computer screen could be said to "detract from normal viewing" on such screens,^{5/} in which the user already expects to encounter a wide variety of symbols and signals.

I hope this letter has answered all of your questions adequately. As noted in my earlier letter, this proposed use of the active video appears fully consistent with prior Bureau rulings. See also Letter from Roy J. Stewart to Jane E. Genster, March 3, 1992. Yes! believes that its proposed use of the active video to permit a new form of interactivity also furthers the

^{3/}(...continued)
v. FCC, 853 F.2d 973 (D.C. Cir. 1988):

" . . . it must be emphasized that the overwhelming majority of homes have more than one broadcast-television receiver, and those who purchase a specialized device such as the SSDD will by all odds have at least one all-channel, broadcast-television receiver at hand."

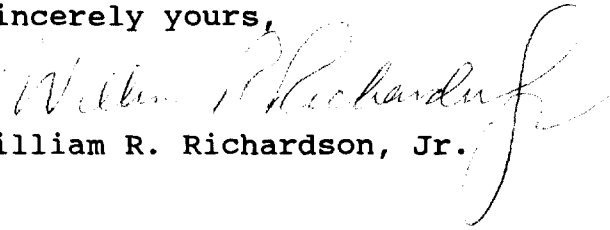
^{4/} See Association of Maximum Service Telecasters v. FCC, 853 F.2d 973 (D.C. Cir. 1988) (SSDD device, like television monitors, not subject to regulation under All-Channel Receiver Act).

^{5/} Revision of Programming and Commercialization Policies, 2 FCC Rcd 6822, 6826 (1987).

statutory policy of encouraging new technologies and the larger and more effective use of radio spectrum, and would significantly add to the diversity of program choices available for children. See 2 FCC Rcd at 6826. Indeed, it promises to create exciting new educational opportunities of the kind specifically encouraged by the Children's Television Act of 1990.

Because Yes! hopes to begin promoting potential broadcasts of TV Teddy in mid-February 1994, for broadcast in March 1994, it would appreciate a prompt ruling on this request.

Sincerely yours,


William R. Richardson, Jr.

Encls.
cc: Gordon Godfrey



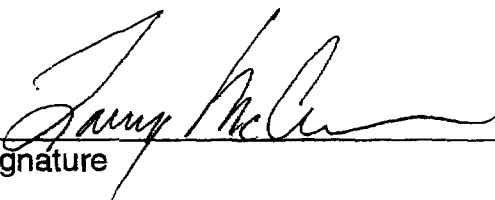
Larry McCracken
Director of Engineering
Yes! Entertainment Corporation
3875 Hopyard Road, Suite 375
Pleasanton, California 94588

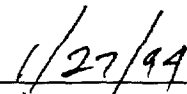
Overscan Measurement Summary

After measuring 102 models of televisions it was found that the TV teddy pulse will not be visible on any of the sets when viewing broadcast encoded programs. The following process was used to make this determination.

- Tested all TVs available with no selection process
- Measured new TVs at two Good Guys department stores
- Measured used TVs at homes of YES! employees and friends
- Total of 102 models tested
- Tested rear projection as well as CRT televisions
- Validated results by playing a TV Teddy packout VCR tape on the worst TV available in one of the stores with no visible TV Teddy signal

For details see the following Overscan Test Report.


Signature


Date

Overscan Test Report

Background:

TV Teddy is a talking bear which interacts with characters and cartoons being played on a VHS video cassette recorder. The technology was developed in a way which would also allow a TV Teddy encoded signal to be broadcast through existing commercial broadcast facilities. The video tape has stereo audio for the television speakers as well as the normal composite video signal for the picture. In order to create Teddy's voice we pulse amplitude encode an audio signal at the beginning of the active video so it wouldn't be visible to the viewer. TV Teddy's voice is encoded into each active video line from lines 22 through 257 on the even fields and lines 285 through 520 on odd fields. The encoding pulse (7.5-100 IRE) is located at the beginning of the active video. There are 236 pulses during each field for an average data rate of 14,160 pulses per second. For broadcast the encoded pulse width is 1.26 usec. The pulse width and location of the encoded pulse relative to horizontal sync are defined by the encoding process, and are fixed parameters in the encoder. These pulse timing parameters can not be changed by the broadcast facility.

In general, all television sets are designed with some overscan on the left and right sides of the picture. This is done so the viewed image will always fill the screen without leaving black edges. Since the circuit design, component tolerances and manufacturing assembly tolerances for televisions are not perfect, the manufacturer needs some overscan to simplify the manufacturing process and improve quality. According to Frank Davidoff, "A Survey of Television Blanking Width Problems", SMPTE (Society of Motion Picture & Television Engineers) Journal, Vol. 88, No. 3, March 1979, p. 149, the typical total overscan is 5-8% for home viewer television sets.

At this time the only TV Teddy encoded materials are the VHS tapes which have been produced and sold for several months. Throughout the TV Teddy product development process we used at least a dozen televisions without any visible signs of the encoded pulse on the screen. Approximately 200,000 TV Teddies were sold at Christmas and the Customer Service Manager has not heard of one comment or complaint about seeing the encoding signal on the screen.

The possibility of seeing this encoded signal will be even less with broadcast programming. Broadcast encoding will be done on 1" or D2 tape using a special encoder that has a narrower pulse width to increase the margin between the edge of our encoded pulse and the beginning of the visible video picture.

Purpose:

The purpose of this investigation was to quantitatively measure the possibility of the TV Teddy signal interfering with broadcast video transmission as viewed on consumer television receivers.

Strategy:

The strategy was to measure the overscan on a large number of televisions which were representative of the general population of home viewer sets. This could then be compared to the proposed TV Teddy broadcast signal timing and an estimate of the number of televisions with visible TV Teddy pulses could be calculated.

Simply playing encoded material through the TV under test would yield basic pass/fail information but would not identify margins. The procedure in Attachment 2 was used to accurately measure the leading edge and trailing edge overscan. For this report the only pertinent information is the leading edge overscan since the TV Teddy signal is a pulse at the beginning of the active video. A diagram of this timing is displayed in Attachment 7.

Data Gathering:

New and used televisions were tested. We tested all televisions available, concentrating on locations with multiple sets. Several stores were approached but the only retail store in our area which would allow us to spend a full day taking data was the Good Guys store in Dublin, California. It was originally estimated we would be able to test 50-60 different models in that store but we only had access to 30. Each set had to be hooked up and tested individually. The data taken at the Good Guys as well as that taken at employees' homes, etc. are contained in Attachment 1.

Attachment 6 shows the television market share by brand as reported in TV Digest, a weekly publication for broadcasting, cable, and consumer electronics fields. The brands tested during the overscan investigation are also identified. We tested brands representing 82% of the CRT display television models and 63% of the rear projection models. The sample consisted of models of many different sizes.

Results:

Of the 102 models tested, 92 were CRT displays with the remaining 10 being rear projection. The average time from horizontal sync to visible video was 11.89 usec for the CRT models and 11.21 usec for the rear projection models. The minimum times were 10.60 usec and 10.72 usec respectively. Attachment 3 contains general statistical calculations while Attachment 7 illustrates this graphically compared to the TV Teddy encoding pulse timing.

After gathering data, we needed to validate the results. Since we could not get back into the Dublin Good Guys for more testing, we went to another Good Guys store in San Francisco. Seven televisions were measured to find one with a low overscan, a Pioneer model (Test Number 97). A VCR was used to play a standard VHS TV

Teddy packout tape on this television . There was no visible TV Teddy encoding signal on the screen.

A comparison of time from horizontal sync to visible video versus diagonal picture size (Attachment 4) illustrates the general trend that as the size of the television increases the overscan decreases. All sets 40 inches and over were rear projection models. Since the ratio of rear projection sets to CRT sets in the market place is extremely low (0.0164 according to TV Digest), the overwhelming majority of consumers will follow the statistics for CRT display televisions which means more margin for the TV Teddy signal.

An analysis of the time from horizontal sync to visible video by brand (Attachment 5) appears to show that manufacturers have a broad spectrum of overscan.

Conclusion:

Measurements were taken on 102 different televisions covering a wide range of sizes and brands. Rear projection as well as the predominant CRT models were tested. In all cases the data shows that TV Teddy encoding pulses will not be visible during broadcast. In fact there is a safeguard of 0.24 usec (10.60 - 10.36 usec) even with the lowest measured television.

Attachment 1

Television Overscan Measurements Data								
Test	Television	Manufacturer	Model Number	Diagonal	Leading Edge	Time From		
Number	Brand	Number		Screen	Overscan	Horizontal	Type	Comments
				Size		Sync		
				(inches)	(usec)	(usec)		
1	Sony	20	KV-20TR23	20	2.44	12.00	CRT	CPI Lab
2	Sony	20	KV-20TR23	20	2.28	11.84	CRT	CPI Lab
3	Sony	20	KV-27XBR10	27	1.76	11.32	CRT	Boardroom
4	Phillips	11	27-K221SB03	27	1.60	11.16	CRT	Maria's
5	Emerson	2	TC1375	13	2.36	11.92	CRT	Maria's
6	Sharp	19	13SB50	13	3.44	13.00	CRT	Maria's
7	Sony	20	KV2670R	26	1.12	10.68	CRT	Maria's Neighbor
8	Sharp	19	13LV56A	13	3.64	13.20	CRT	Maria's Neighbor
9	Sony	20	KV32TS-20	32	1.36	10.92	CRT	Maria's Friend
10	Lloyds	7	L518	18	2.60	12.16	CRT	Maria's Friend
11	Hitachi	5	CT2033B	20	3.24	12.80	CRT	Patti's
12	RCA	14	EFR398WR	17	3.24	12.80	CRT	Patti's
13	RCA	14	FMR2723E	27	2.20	11.76	CRT	Holly's
14	GE	3	20GT420	20	2.72	12.28	CRT	Holly's
15	Magnavox	8	RR1345C101	13	2.28	11.84	CRT	Holly's
16	Zenith	22	SE2569W	25	2.60	12.16	CRT	Holly's Mom
17	Emerson	2	M1975R	19	2.00	11.56	CRT	Holly's Mom
18	Panasonic	10	CT9043	19	1.76	11.32	CRT	Holly's Friend
19	RCA	14	XL100	13	2.68	12.24	CRT	Holly's Friend
20	Zenith	22	A2508P	25	3.64	13.20	CRT	Holly's Brother
21	Emerson	2	VT1921	19	1.96	11.52	CRT	Holly's Brother
22	Sony	20	KV32XBR36	32	2.16	11.72	CRT	Dave's
23	Hitachi	5	CK-200	5	3.76	13.32	CRT	Dave's
24	Sony	20	KX-1901	19	3.64	13.20	CRT	Dave's
25	Panasonic	10	CT-13R20	13	2.96	12.52	CRT	Good Guys
26	Panasonic	10	CT-13R10	13	3.20	12.76	CRT	Good Guys
27	RCA	14	E09303KW	9	2.80	12.36	CRT	Good Guys
28	Goldstar	4	GCT1350M	13	1.48	11.04	CRT	Good Guys
29	Goldstar	4	CN14A10	13	1.56	11.12	CRT	Good Guys
30	Goldstar	4	CMS4841	13	1.24	10.80	CRT	Good Guys
31	JVC	6	C13CL4	13	2.36	11.92	CRT	Good Guys
32	Sharp	19	13EM50	13	3.28	12.84	CRT	Good Guys
33	RCA	14	E09301BT	9	2.20	11.76	CRT	Good Guys
34	Magnavox	8	RR1333C	13	2.12	11.68	CRT	Good Guys
35	Sony	20	KV8AD11GRAY	8	2.32	11.88	CRT	Good Guys
36	Magnavox	8	CCR095AT	9	2.28	11.84	CRT	Good Guys
37	Philips	11	13R201C4	13	1.52	11.08	CRT	Good Guys
38	Philips	11	13S250C1	13	2.00	11.56	CRT	Good Guys
39	Hitachi	5	31DX21B	31	1.64	11.20	CRT	Good Guys
40	Proscan	12	PS31122	31	2.44	12.00	CRT	Good Guys
41	Panasonic	10	CT27S15	27	2.08	11.64	CRT	Good Guys
42	Mitsubishi	9	CS313001	31	3.32	12.88	CRT	Good Guys
43	Toshiba	21	ST307	35	1.84	11.40	CRT	Good Guys
44	Toshiba	21	CF30C50	30	1.88	11.44	CRT	Good Guys
45	Toshiba	21	CF32C50	32	1.80	11.36	CRT	Good Guys
46	RCA	14	F31631SE	31	1.60	11.16	CRT	Good Guys
47	Toshiba	21	CN32C90	32	2.12	11.68	CRT	Good Guys
48	JVC	6	AV35BH4	35	1.04	10.60	CRT	Good Guys
49	Sony	20	KP46XBR25	46	1.16	10.72	Rear Projection	Good Guys
50	Sony	20	KP41EXR96	41	1.28	10.84	Rear Projection	Good Guys
51	RCA	14	P46730WK	46	1.68	11.24	Rear Projection	Good Guys
52	Toshiba	21	TP48C90	48	1.56	11.12	Rear Projection	Good Guys
53	Mitsubishi	9	50UX15K	50	2.28	11.84	Rear Projection	Good Guys
54	Hitachi	5	46EX3B	46	1.32	10.88	Rear Projection	Good Guys
55	Sony	20	KB-32TS36	32	1.88	11.44	CRT	Bill's
56	Mitsubishi	9	Unknown	25	2.04	11.60	CRT	Craig's
57	Realistic	15	16108	5	1.72	11.28	CRT	Craig's

Attachment 1

Television Overscan Measurements Data								
Test	Television	Manufacturer	Model Number	Diagonal	Leading Edge	Time From		
Number	Brand	Number		Screen	Overscan	Horizontal	Type	Comments
				Size	(usec)	Sync		
				(Inches)		(usec)		
58	Mitsubishi	9	CS-3535K	35	2.24	11.80	CRT	Craig's
59	Radio Shack	13	16-232A	13	4.40	13.96	CRT	Craig's
60	Sharp	19	Unknown	13	2.00	11.56	CRT	Craig's
61	Toshiba	21	CX2033	20	2.96	12.52	CRT	Don's
62	Toshiba	21	CX2047J	20	2.44	12.00	CRT	Don's
63	Mitsubishi	9	CS2669R	26	1.80	11.36	CRT	Don's
64	Panasonic	10	CTL2042R	20	2.52	12.08	CRT	Don's
65	Mitsubishi	9	CK3502R	35	1.68	11.24	CRT	Don's
66	Toshiba	21	CZ2685	26	1.60	11.16	CRT	Don's
67	Mitsubishi	9	Unknown	35	1.92	11.48	CRT	Sol's
68	Mitsubishi	9	Unknown	44	2.60	12.16	Rear Projection	Sol's
69	Sony	20	KV-1515	15	2.72	12.28	CRT	Sol's
70	Zenith	22	SS1935W9	19	2.44	12.00	CRT	Sol's
71	Panasonic	10	CTN-31883	31	1.88	11.44	CRT	Mark's
72	Citek	1	7495A	25	3.00	12.56	CRT	Mark's
73	Mitsubishi	9	VS4001R	40	1.56	11.12	Rear Projection	Mark's Neighbor
74	Toshiba	21	TP5288J	52	1.88	11.44	Rear Projection	Mark's Neighbor
75	Mitsubishi	9	CS2010R	20	2.72	12.28	CRT	Mark's Neighbor
76	Zenith	22	JS2765S5	27	2.12	11.68	CRT	Richard's
77	Sanyo	17	AVM195	19	1.64	11.20	CRT	Larry's
78	Sears	18	934.4017005	9	2.68	12.24	CRT	Larry's
79	Goldstar	4	CR-407	13	2.24	11.80	CRT	Larry's
80	Samsung	16	TC-9865TB	19	2.56	12.12	CRT	Larry's
81	Sony	20	KV-20TR23	20	2.00	11.56	CRT	CA Conf Room
82	Mitsubishi	9	CS-20101	20	2.60	12.16	CRT	CA Conf Room
83	Sony	20	KV-19TR20	19	1.80	11.36	CRT	CA Conf Room
84	Philips	11	27K221SB03	27	2.48	12.04	CRT	Claudia's Friend
85	Sony	20	Unknown	26	2.24	11.80	CRT	Claudia's Friend
86	Philips	11	21CM4462	21	2.44	12.00	CRT	Claudia's
87	Toshiba	21	CF2668B	26	1.60	11.16	CRT	Claudia's
88	Toshiba	21	CF2027B	27	2.16	11.72	CRT	Claudia's
89	Sony	20	1380R	13	3.00	12.56	CRT	Measured by ABC
90	Sony	20	KV-1367	13	3.00	12.56	CRT	Measured by ABC
91	Zenith	22	SD-2593Y	25	3.00	12.56	CRT	Measured by ABC
92	Zenith	22	SG-2037W	20	3.00	12.56	CRT	Measured by ABC
93	Sony	20	KV27V55	27	2.50	12.06	CRT	Measured by ABC
94	Sony	20	KV25XBR	25	2.00	11.56	CRT	Measured by ABC
95	Sony	20	KV19TR20	19	2.50	12.06	CRT	Measured by ABC
96	Sony	20	KV1720	17	3.00	12.56	CRT	Measured by ABC
97	Pioneer	23	SDPY561Q	45	1.16	10.72	Rear Projection	Good Guys
98	Philips	11	27K221SB03	27	2.48	12.04	CRT	Good Guys
99	Sony	20	KV2670R	26	2.24	11.80	CRT	Good Guys
100	Philips	11	21CM4462	21	2.44	12.00	CRT	Good Guys
101	Toshiba	21	CF2668B	26	1.60	11.16	CRT	Good Guys
102	Toshiba	21	CF2027B	27	1.16	10.72	CRT	Good Guys
Notes:								
1. The leading Edge Overscan was measured using the procedure in Attachment 2.								
2. The Time From Horizontal Sync is the Leading Edge Overscan + 9.56 usec.								
3. "Good Guys" TVs were new in a store while all others were used.								

Attachment 2

Television Overscan Measurement Procedure

Purpose: To quantitatively measure the amount of leading and trailing horizontal overscan on the television active video image.

Method: A Waveform Generator was used to put a vertical white line on the television screen. This line was then moved to the left side of the screen until it was no longer visible and the time from the beginning of active video to the end of the white line was measured. The same procedure was used to measure the same parameter at the right side of the screen. Figure 2 illustrates the measurement periods.

Equipment:

Tektronix 1410 NTSC Generator
Tektronix TDS 544A Digitizing Oscilloscope
Radio Shack RF Modulator
75 ohm to 300 ohm matching transformer
Miscellaneous cables

Equipment Set Up:

1. Connect the equipment as shown in Figure 1. The RF Modulator has an internal 75 ohm load so no other termination is required. If the Television Under Test (TUT) does not have a "F" connector input for 75 ohm coax, use a 75 ohm to 300 ohm matching transformer and connect to the twin lead input.
2. Turn on power to all equipment.
3. Set the RF Mod to **CH 3** with the input switch at **75 Ohm**.

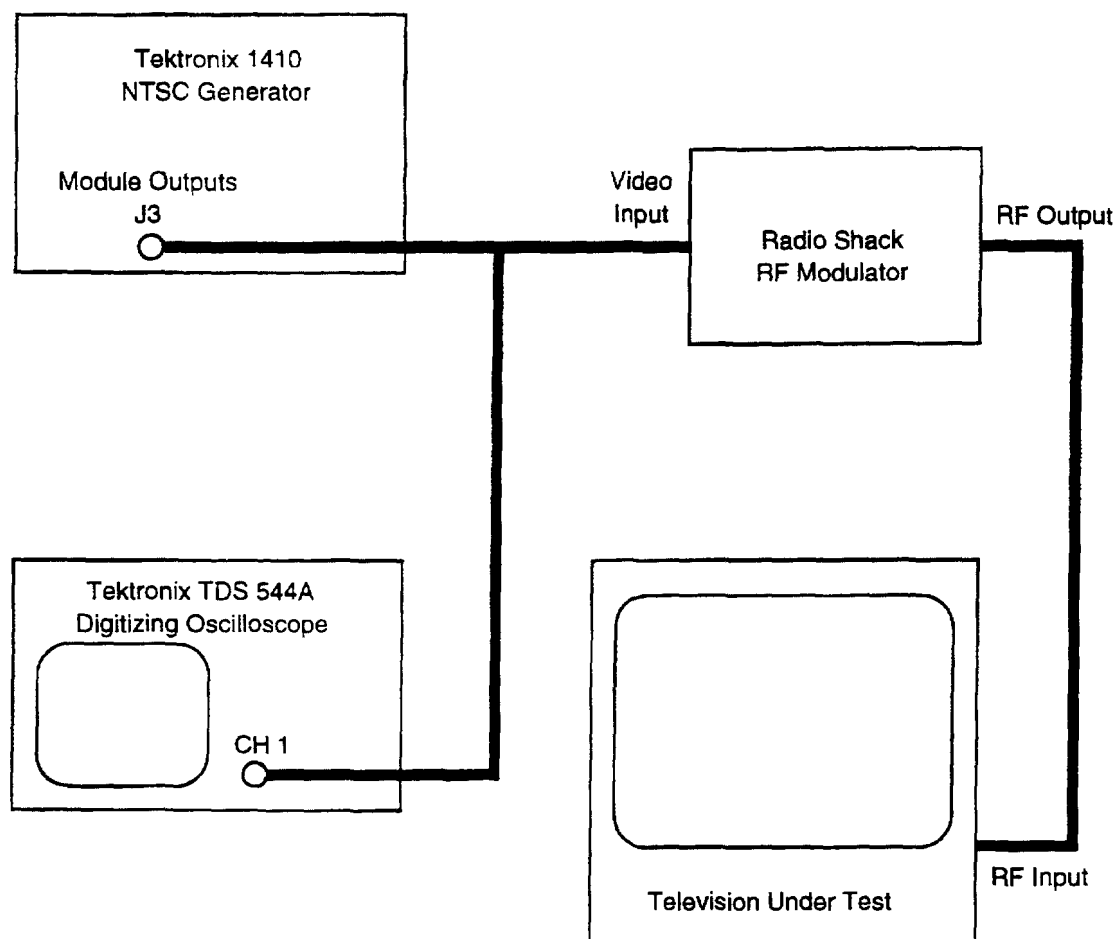


Figure 1. Equipment Set Up

4. 1410 initialization:

Note: The only controls which affect operation are in the **SWITCHER** module.

- **CONV KEY** pressed in
- **C** pressed in
- **CROSSHATCH / VERT LINES** pressed in
- All other switches should be out

5. 544 initialization:

- A. Recall the setup **TEK00000.SET (94-01-03)** from the floppy disk.
- B. Select **VIDEO** trigger.
- C. Press **CURSOR** then **CLEAR MENU**.

D. If everything is correct the 544 display wave shape should look like Figure 2.

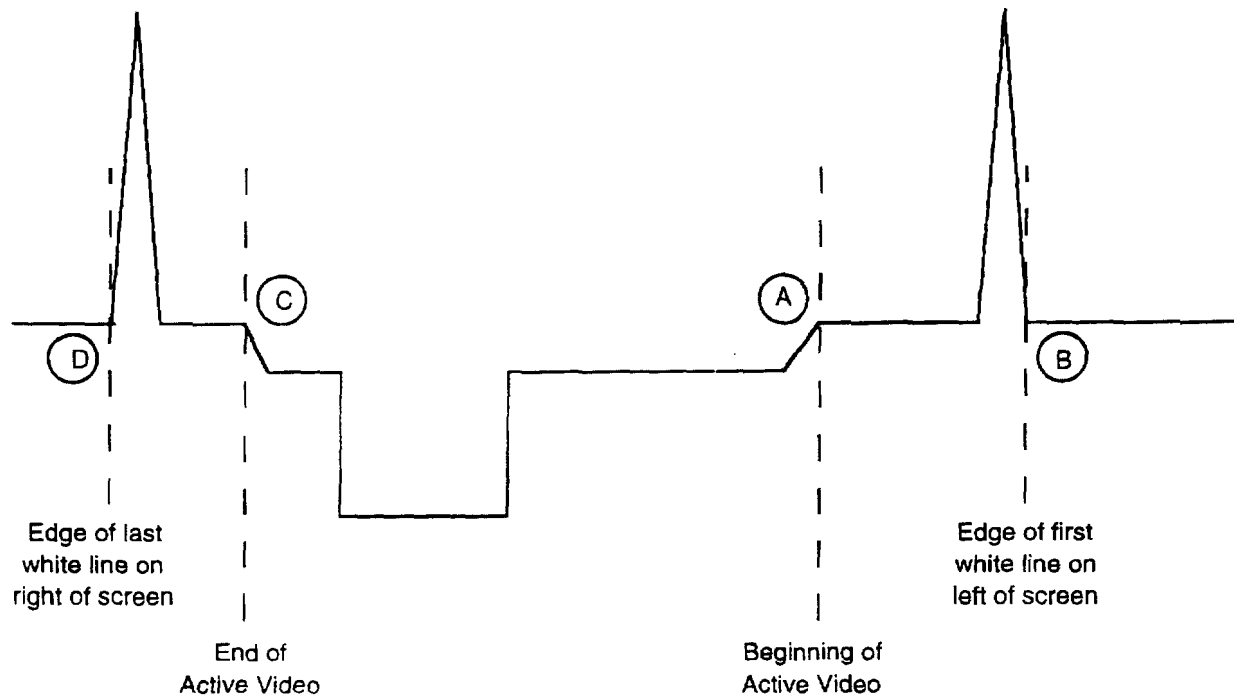


Figure 2. Typical horizontal sync pulse with first and last vertical lines as seen on the 544 oscilloscope.

Overscan Measurement Procedure:

1. Record the Brand, Model and Diagonal Screen Size of the TUT on the data sheet.
2. Connect the **RF OUT** form the RF Mod to the TUT input and turn on the TUT power if it is not already on.
3. The TUT display should consist of a black screen with vertical white lines.
4. Leading Edge Overscan Measurement:
 - A. Turn the 1410 **SWITCHER - HORIZ POSITION** knob full clockwise.

- B. Slowly turn the **HORIZ POSITION** counter clockwise until the left most vertical line is just off the screen and out of view.

Note: There is some smearing to the right of each line. Set the line position so no bright white is visible on the screen. When properly set, slight movement of **HORIZ POSITION** should cause the edge of the bright white line to appear and disappear.

- C. Place one cursor of the 544 at the beginning of active video (A) as shown in Figure 2. Place the other cursor at (B).
- D. Record the leading edge overscan as read from the 544. (See the upper right corner of the 544 display - delta: ____ uS).

4. Trailing Edge Overscan Measurement:

- A. Turn the 1410 **SWITCHER - HORIZ POSITION** knob full counter clockwise.
- B. Slowly turn the **HORIZ POSITION** clockwise until the right most vertical line is just off the screen and out of view.

Note: When properly set, slight movement of **HORIZ POSITION** should cause the edge of the bright white line to appear and disappear.

- C. Place one cursor of the 544 at the end of active video (C) as shown in Figure 2. Place the other cursor at (D).
- D. Record the trailing edge overscan as read from the 544. (See the upper right corner of the 544 display - delta: ____ uS).

5. Disconnect the RF input from the TUT.
6. This completes the overscan measurements on this television. Go to the next set to be measured and repeat the procedure.

Attachment 3

Time From Horizontal Sync To Visible Video

Statistical Information

The following information was calculated from the **Television Overscan Measurements Data** recorded in Attachment 1. For comparison it has been sorted into the two display types.

Time From Horizontal Sync To Visible Video

CRT Models:

Number of models	92
Average	11.89 usec
Maximum	13.96 usec
Minimum	10.60 usec
Standard deviation	0.65 usec

Rear Projection Models:

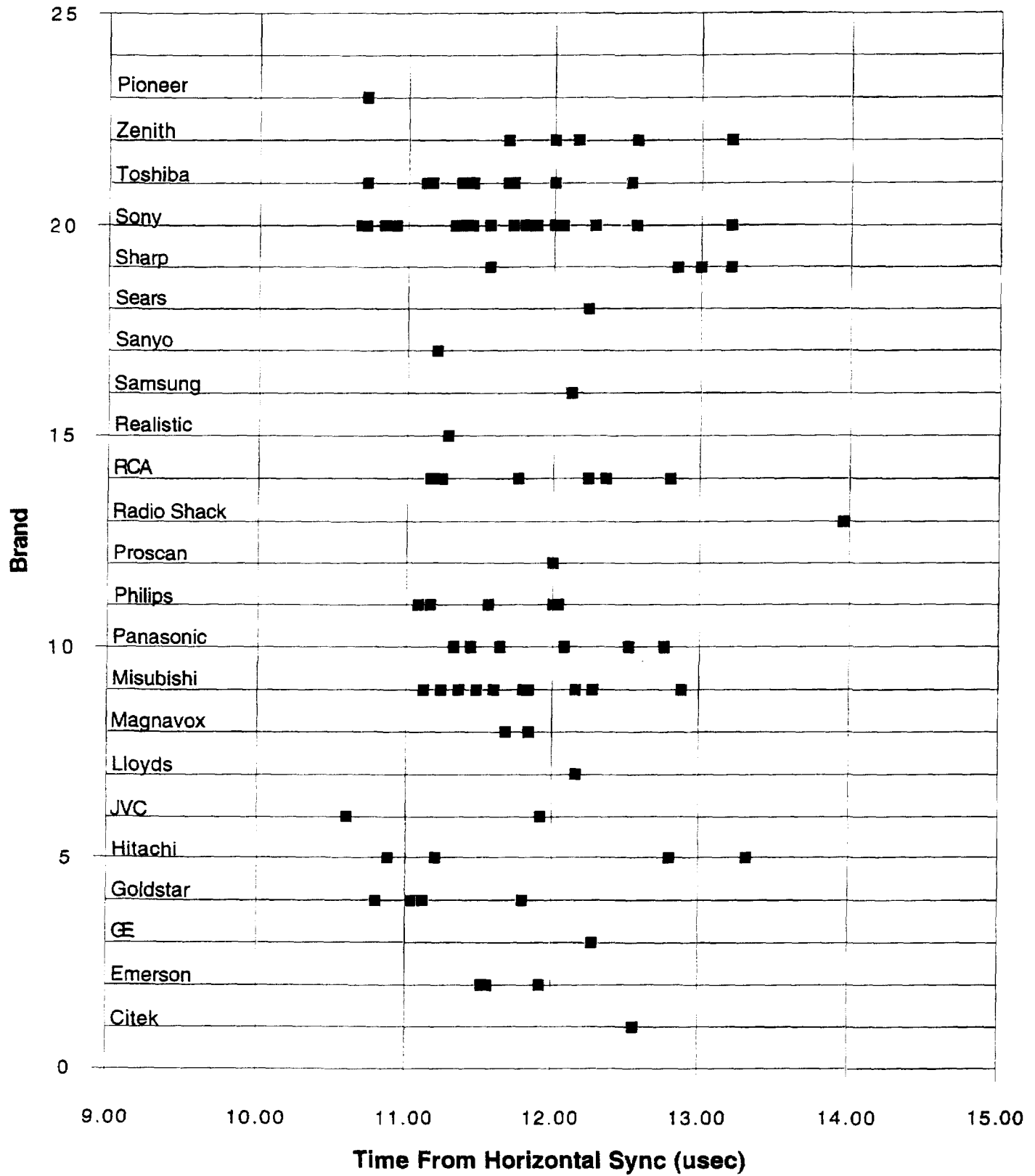
Number of models	10
Average	11.21 usec
Maximum	12.16 usec
Minimum	10.72 usec
Standard deviation	0.48 usec

4013016



Attachment 5

Television Brand Scatter Diagram



Attachment 6

Television Market Share By Brand							
CRT Models				Rear Projection Models			
Rank	Brand	% Share	# Tested	Rank	Brand	% Share	# Tested
1	RCA/Proscan	16.3	7	1	Mitsubishi	19	3
2	Magnavox	10.25	3	2	RCA/Proscan	17	1
3	Zenith	10	6	3	Magnavox	14	
4	Sony	6.6	20	4	Hitachi	10	1
5	Sharp	5.5	4	5	Sony	8.5	2
6	GE	5	1	6	Pioneer	7	1
7	Toshiba	4.6	11	7	LXI (Sears)	4	
8	Emerson	4	3	8	Zenith	2.4	
9	Panasonic	3.5	6	9	Toshiba	2	2
10	Mitsubishi	2.55	8	10	Philips	2	
11	LXI (Sears)	2.45	1	11	Panasonic	1.5	
12	Samsung	2.3	1	12	GE	1.5	
13	Sanyo	2.1	1	13	Sharp	1.35	
14	JVC	2	2	14	Sylvania	1.25	
15	Goldstar	1.7	4	15	Quasar	1.2	
16	Montgomery Wards	1.7		16	Montgomery Wards	0.5	
17	Sylvania	1.5					
18	Hitachi	1.5	3		Total, 16 Brands	93.2%	
19	Quasar	1.2			All other brands	6.8%	
20	KTV	0.55					
21	Symphonic/Funai	0.5			Total number tested =	10	
22	Philco	0.5					
23	Fisher	0.5					
24	Philips	0.5	7				
25	Memorex	0.5					
26	Daewoo	0.5					
27	J.C.Penney	0.5					
*	Citek	0.5	1				
*	Lloyds	0.5	1				
*	Radio Shack/Realistic	0.5	2				
28	Curtis Mathes	0.4					
	Total, 31 Brands	90.7%					
	All other brands	9.3%					
	Total number tested =	92					
*	These brands were tested but were not part of the TV Digest list.						
	Assume 0.5% each.						
Note: Data from TV Digest, Vol. 33, No. 35, August 30, 1993, pp 11-12.							

Attachment 7

Horizontal Sync Timing

